

$$\frac{x \sin 3x}{6}$$

Physics

Section Id :	477203371
Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 51 Question Id : 47720318879 Display Question Number : Yes Is Question Mandatory : No

The dimension of Universal Gas Constant “R” is:

Options :

1. ✖ $[M^2 L^2 T^{-2} K^{-1}]$
2. ✖ $[M^1 L^2 T^{-2}]$
3. ✔ $[M^1 L^2 T^{-2} K^{-1}]$
4. ✖ $[M^2 L^2 T^{-2} K^0]$

Question Number : 52 Question Id : 47720318880 Display Question Number : Yes Is Question Mandatory : No

The value of Planck's constant 'h' is $6.626 \times 10^{-34} \text{ J.Hz}^{-1}$. Its value in eV is

Options :

1. ✖ 1.054×10^{-34}

2. ✔ 4.135×10^{-15}

3. ✖ 0.241×10^{15}

4. ✖ Unchanged

Question Number : 53 Question Id : 47720318881 Display Question Number : Yes Is Question Mandatory : No

A unit vector perpendicular to $A = \hat{i} + \hat{j} - \hat{k}$ and $B = 2\hat{i} - \hat{j} + 3\hat{k}$ is

Options :

1. ✖ $\hat{n} = (2\hat{i} - \hat{j} - 3\hat{k}) / \sqrt{14}$

2. ✔ $\hat{n} = (2\hat{i} - 5\hat{j} - 3\hat{k}) / \sqrt{38}$

3. ✖ $\hat{n} = (2\hat{i} - 5\hat{j} - 3\hat{k}) / \sqrt{28}$

4. ✖ $\hat{n} = (\hat{i} - \hat{j} - \hat{k}) / \sqrt{3}$

Question Number : 54 Question Id : 47720318882 Display Question Number : Yes Is Question Mandatory : No

If the two vectors **A** and **B** are such that $|\mathbf{A}-\mathbf{B}| = |\mathbf{A}+\mathbf{B}|$ then

Options :

1. ✖ $\mathbf{A} = \mathbf{B}$

2. ✖ A is parallel to B

3. ✖ $|\mathbf{B}| = 0$

4. ✔ A is perpendicular to B

Question Number : 55 Question Id : 47720318883 Display Question Number : Yes Is Question Mandatory : No

A rubber ball of mass 0.2 kg falls onto the floor. The ball hits with a speed of 8 m/s and rebounds with approximately the same speed. High speed photographs show that the ball is in contact with the floor for 10^{-3} s. Then the average force exerted on the ball by the floor is

Options :

1. ✖ 1,600 N

2. ✖ 0 N

3. ✔ 3,200 N

4. ✖ 320 N

Question Number : 56 Question Id : 47720318884 Display Question Number : Yes Is Question Mandatory : No

A projectile is fired with a speed 'u' at an angle θ with the horizontal. Find its speed when its direction of motion makes an angle α with the horizontal.

Options :

1. ✖ $u \cos(\theta) \cos(\alpha)$

2. ✖ $u \cos(\theta)$

3. ✖ $u \cos(\alpha)$

4. ✔ $u \cos(\theta) \sec(\alpha)$

Question Number : 57 Question Id : 47720318885 Display Question Number : Yes Is Question

Mandatory : No

A person travelling on a straight line moves with a uniform velocity ' v_1 ' for a distance ' x ' and with a uniform velocity ' v_2 ' for the next equal distance. The average velocity ' v ' is given by

Options :

1. ✖ $v = \frac{v_1 + v_2}{2}$

2. ✖ $v = \sqrt{v_1 v_2}$

3. ✔ $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

4. ✖ $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

Question Number : 58 Question Id : 47720318886 Display Question Number : Yes Is Question

Mandatory : No

A ball is dropped from a height ' H '. If it takes 0.2 sec to cross the last 6.0 m before hitting the ground, the value of height ' H ' from which it was dropped is

Options :

1. ✔ 48 m

2. ✖ 42 m

3. ✖ 12 m

4. ✖ 30 m

Question Number : 59 Question Id : 47720318887 Display Question Number : Yes Is Question Mandatory : No

Mark the correct statement about the frictional force 'f' when a body slides across a surface with coefficient of friction μ .

Options :

1. ✖ The magnitude of 'f' is less than μN

2. ✔ 'f' is independent of the area of contact

3. ✖ 'f' depends on the area of contact

4. ✖ 'f' is directly proportional to the instantaneous velocity of the body

Question Number : 60 Question Id : 47720318888 Display Question Number : Yes Is Question Mandatory : No

A body starts slipping down an incline and moves half meter in half second. How long will it take to move the next half meter?

Options :

1. ✔ 0.2 sec

2. ✖ 0.5 sec

3. ✖ 1.0 sec

4. ✖ 0.1 sec

Question Number : 61 Question Id : 47720318889 Display Question Number : Yes Is Question Mandatory : No

The energy needed to eject a 50kg spacecraft from the surface of the earth is (radius of the earth is 6.4×10^6 m)

Options :

1. ✖ 1.1×10^4 J

2. ✖ 1.1×10^9 J

3. ✖ 3.13×10^4 J

4. ✔ 3.13×10^9 J

Question Number : 62 Question Id : 47720318890 Display Question Number : Yes Is Question Mandatory : No

A particle of mass 'm' moves in one dimension along the positive x-axis. It is acted on by a constant force directed towards the origin with magnitude 'B', and an inverse square law repulsive force with magnitude (A/x^2) away from the origin. The equilibrium position x_0 of the mass is at

Options :

1. ✖ $x_0=0$

2. ✔ $x_0=(A/B)^{1/2}$

3. ✖ $x_0 = (A/B)$

4. ✖ $x_0 = (B/A)^{1/2}$

Question Number : 63 Question Id : 47720318891 Display Question Number : Yes Is Question Mandatory : No

Ocean thermal energy is due to

Options :

1. ✖ Energy stored by waves in the ocean

2. ✖ Tides arising out in the ocean

3. ✖ Pressure difference at different levels in the ocean

4. ✔ Temperature difference at different levels in the ocean

Question Number : 64 Question Id : 47720318892 Display Question Number : Yes Is Question Mandatory : No

Consider the wave $y = (10 \text{ mm}) \sin[(2 \text{ cm}^{-1})x - (60 \text{ s}^{-1})t]$. The time period of this wave is

Options :

1. ✔ $\frac{\pi}{30} \text{ sec}$

2. ✖ $\frac{30}{\pi} \text{ sec}$

3. ✖ $\frac{\pi}{60} \text{ sec}$

4. ✖ $\frac{\pi}{120} \text{ sec}$

Question Number : 65 Question Id : 47720318893 Display Question Number : Yes Is Question Mandatory : No

If the speed of sound at 0°C is 332ms^{-1} , then the atmospheric temperature of a day when sound travels 336 m in one second is

Options :

1. ✖ 4°C

2. ✖ 20°C

3. ✖ 17°C

4. ✔ 7°C

Question Number : 66 Question Id : 47720318894 Display Question Number : Yes Is Question Mandatory : No

A sound source vibrates with a frequency of 1.0 kHz. Two sound waves, originating from this source, travel along different paths in air, where one path is 166 cm longer than other and then meet at a point. Then what will be the nature of interference? The speed of sound in air is 332 ms^{-1} .

Options :

1. ✔ It will be a constructive interference

2. ✖ It will be a destructive interference

3. ✖ Provided information is insufficient to say about nature of interference

4. ✖ It will depend on the type of source

Question Number : 67 Question Id : 47720318895 Display Question Number : Yes Is Question

Mandatory : No

A simple pendulum is taken to a place in space where its distance from the surface of the earth is equal to the radius of the earth. What will be the time period of small oscillations of the pendulum if the length of the string is 1.0 m. Take $g = \pi^2 \text{ m/s}^2$ at the surface of the earth.

Options :

1. ✖ 2 sec

2. ✔ 4 sec

3. ✖ $\frac{1}{\pi} \text{ sec}$

4. ✖ $2\pi \text{ sec}$

Question Number : 68 Question Id : 47720318896 Display Question Number : Yes Is Question

Mandatory : No

The motion of a block of mass 'm' is restricted on x-axis by attaching two identical springs of spring constant 'k' on its opposite sides. The other ends of the springs are fixed on walls. When the mass is displaced from its equilibrium position on either side, it executes a simple harmonic motion. The period of oscillations for this oscillation is

Options :

1. ✖ $2\pi \sqrt{\frac{m}{k}}$

2. ✖ $2\pi\sqrt{\frac{k}{m}}$

3. ✖ $2\pi\sqrt{\frac{2k}{m}}$

4. ✔ $2\pi\sqrt{\frac{m}{2k}}$

Question Number : 69 Question Id : 47720318897 Display Question Number : Yes Is Question Mandatory : No

Is it always true that $dU = C_v dT$?

Options :

1. ✖ Yes.

2. ✖ No, it is never true

3. ✔ It is true only for ideal gas

4. ✖ It is true only for non-ideal gas

Question Number : 70 Question Id : 47720318898 Display Question Number : Yes Is Question Mandatory : No

One mole of ideal monatomic gas is confined in a cylinder by a piston and is maintained at a constant temperature T_0 by thermal contact with a heat reservoir. The gas slowly expands from V_1 to V_2 while being held at the same temperature T_0 . The change in internal energy of the gas is

Options :

1. ✖ $RT_0 \ln(V_2/V_1)$

2. ✓ zero

3. ✗ RT_0

4. ✗ $RT_0 \ln(V_1/V_2)$

Question Number : 71 Question Id : 47720318899 Display Question Number : Yes Is Question Mandatory : No

A pan filled with hot food cools from 94°C to 86°C in 2 minutes when the room temperature is at 20°C . How long will it take to cool from 71°C to 69°C ?

Options :

1. ✓ 0.7 min

2. ✗ 0.5 min

3. ✗ 0.4 min

4. ✗ 2 min.

Question Number : 72 Question Id : 47720318900 Display Question Number : Yes Is Question Mandatory : No

In an adiabatic expansion of an ideal gas

Options :

1. ✗ $PV = \text{constant}$

2. ✗ $PV^{\gamma-1} = \text{constant}$

3. ✖ $TV^\gamma = \text{constant}$

4. ✔ $P^{1-\gamma}T^\gamma = \text{constant}$

Question Number : 73 Question Id : 47720318901 Display Question Number : Yes Is Question Mandatory : No

The rms speed of a nitrogen (N_2) molecule at 300K is (One mole of N_2 has a mass of 28 g and $k_B = 1.38 \times 10^{-23} \text{ JK}^{-1}$)

Options :

1. ✖ 450 ms^{-1}

2. ✖ 123 ms^{-1}

3. ✔ 517 ms^{-1}

4. ✖ 230 ms^{-1}

Question Number : 74 Question Id : 47720318902 Display Question Number : Yes Is Question Mandatory : No

Which of the following are not the properties of superconductors?

Options :

1. ✖ They possess infinite conductivity

2. ✖ They possess zero resistivity

3. ✔ They are ferromagnetic in nature

4. ✖ They are diamagnetic in nature

Question Number : 75 Question Id : 47720318903 Display Question Number : Yes Is Question Mandatory : No

The minimum energy required for a photoelectron to escape from a metal plate in a photocell is called

Options :

1. ✖ Planck's constant

2. ✔ Work function

3. ✖ Threshold energy

4. ✖ Stopping voltage

Chemistry

Section Id :	477203372
Section Number :	3
Mandatory or Optional :	Mandatory
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Question Number : 76 Question Id : 47720318904 Display Question Number : Yes Is Question Mandatory : No